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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70) REC 0 PCT/FTC

	(PCT Article 36	5 and Rule 70) Rec'd PCT/FTC 27 MAY 2005		
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TO COMP (COMPANDED TO THE COMPANDED TO T	CT/SG2002/000279 28 November 2002 28 November 2002			
International Patent Classification (IPC) or nati	onal classification a	nd IPC		
Int. Cl. 7 G06F 17/00				
Applicant INSTITUTE FOR INFOCOMM RE	SEARCH et al			
11	mucic 50.	pared by this International Preliminary Examining Authority and		
2. This REPORT consists of a total of 3 she				
This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).				
These annexes consist of a total of 6 sheet(s).				
3. This report contains indications relating to the	ne following items:			
I X Basis of the report		•		
II Priority				
III Non-establishment of opinion	with regard to novel	Ity, inventive step and industrial applicability.		
IV Lack of unity of invention	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  IV Lack of unity of invention			
V X Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement				
VI Certain documents cited				
VII Certain defects in the internation	efects in the international application			
VIII Certain observations on the international application				
Date of submission of the demand	Do	ti of an I di		
May 2004  Date of completion of the report  18 January 2005				
Jame and mailing address of the IPEA/AU . Authorized Officer				
USTRALIAN PATENT OFFICE O BOX 200, WODEN ACT 2606, AUSTRALIA				
-mail address: pct@ipaustralia.gov.au acsimile No. (02) 6285 3929  Michael Lander				
	` . i	lephone No. (02) 6283 2494		
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## CLAIMS:

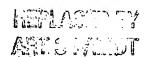
 A method of summarizing digital audio data comprising the steps of:

analyzing the audio data to identify a representation of the audio data having at least one calculated feature characteristic of the audio data;

classifying the audio data on the basis of the representation into a category selected from at least two categories; and

generating an acoustic signal representative of a summarization of the digital audio data, wherein the summarization is dependent on the selected category.

- 2. A method as claimed in claim 1, wherein the analyzing step further comprises segmenting audio data into segment frames, and overlapping the frames.
- 3. A method as claimed in claim 2, wherein the classifying step further comprises classifying the frames into a category by collecting training data from each frame and determining classification parameters by using a training calculation.
- 4. A method as claimed in any preceding claim, wherein the calculated feature comprises perceptual and subjective features related to music content.
- 5. A method as claimed in claim 3, wherein the training calculation comprises a statistical learning algorithm

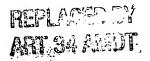


wherein the statistical learning algorithm is Hidden Markov Model, Neural Network, or Support Vector Machine.

- 6. A method as claimed in any preceding claim, wherein the type of acoustic signal is music.
- 7. A method as claimed in any preceding claim, wherein the type of acoustic signal is vocal music or pure music.
- 8. A method as claimed in any preceding claim, wherein the calculated feature is amplitude envelope, power spectrum or mel-frequency cepstral coefficients.
- A method as claimed in any preceding claim, wherein the summarization is generated in terms of clustered results and heuristic rules related to pure or vocal music.
- 10. A method as claimed in any preceding claim, wherein the calculated feature relates to pure or vocal music content and is linear prediction coefficients, zero crossing rates, or mel-frequency cepstral coefficients.
- 11. An apparatus for summarizing digital audio data comprising:

a feature extractor for receiving audio data and analyzing the audio data to identify a representation of the audio data having at least one calculated feature characteristic of the audio data;

a classifier in communication with the feature extractor for classifying the audio data on the basis of the

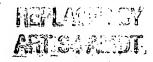


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representation received from the feature extractor into a category selected from at least two categories; and

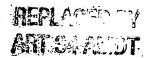
a summarizer in communication with the classifier for generating an acoustic signal representative of a summarization of the digital audio data, wherein the summarization is dependent on the category selected by the classifier.

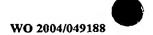
- 12. An apparatus as claimed in claim 11, further comprising a segmentor in communication with the feature extractor for receiving an audio file and segmenting audio data into segment frames, and overlapping the frames for the feature extractor.
- 13. An apparatus as claimed in claim 12, further comprising a classification parameter generator in communication with the classifier, wherein the classifier classifies each of the frames into a category by collecting training data from each frame and determining classification parameters by using a training calculation in the classification parameter generator.
- 14. An apparatus as claimed in any of claims 11-13, wherein the calculated feature comprises perceptual and subjective features related to music content.
- 15. An apparatus as claimed in any of claims 11-14, wherein the training calculation comprises a statistical learning algorithm wherein the statistical learning algorithm is Hidden Markov Model, Neural Network, or Support Vector Machine.



- 16. An apparatus as claimed in any of claims 11-15, wherein the acoustic signal is music.
- 17. An apparatus as claimed in any of claims 11-16, wherein the acoustic signal is vocal music or pure music.
- 18. An apparatus as claimed in any of claims 11-17, wherein the calculated feature is amplitude envelope, power spectrum or mel-frequency cepstral coefficients.
- 19. An apparatus as claimed in any of claims 11-18, wherein the summarizer generates the summarization in terms of clustered results and heuristic rules related to pure or vocal music.
- 20. An apparatus as claimed in any of claims 11-19, wherein the calculated feature relates to pure or vocal music content and is linear prediction coefficients, zero crossing rates, or mel-frequency.
- 21. A computer program product for summarizing digital audio data comprising a computer usable medium having computer readable program code means embodied in said medium for causing the summarizing of digital audio data, said computer program product comprising:

a computer readable program code means for analyzing the audio data to identify a representation of the audio data having at least one calculated feature characteristic of the audio data;

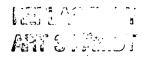




a computer readable program code for classifying the audio data on the basis of the representation into a category selected from at least two categories; and

a computer readable program code for generating an acoustic signal representative of a summarization of the digital audio data, wherein the summarization is dependent on the selected category.

- 22. A computer program product as claimed in claim 21, wherein analyzing further comprises segmenting audio data into segment frames, and overlapping the frames.
- 23. A computer program product as claimed in claim 22, wherein classifying further comprises classifying the frames into a category by collecting training data from each frame and determining classification parameters by using a training calculation.
- 24. A computer program product as claimed in any of claims 21-23, wherein the calculated feature comprises perceptual and subjective features related to music content.
- 25. A computer program product as claimed in any of claims 21-24, wherein the training calculation comprises a statistical learning algorithm wherein the statistical learning algorithm is Hidden Markov Model, Neural Network, or Support Vector Machine.
- 26. A computer program product as claimed in any of claims 21-25, wherein the acoustic signal is music.



- 27. A computer program product as claimed in any of claims 21-26, wherein the type of acoustic signal is vocal music or pure music.
- 28. A computer program product as claimed in any of claims 21-27, wherein the calculated feature is amplitude envelope, power spectrum or mel-frequency cepstral coefficients.
- 29. A computer program product as claimed in any of claims 21-28, wherein the summarization is generated in terms of clustered results and heuristic rules related to pure or vocal music.
- 30. A computer program product as claimed in any of claims 21-29, wherein the calculated feature relates to pure or vocal music content and is linear prediction coefficients, zero crossing rates, or mel-frequency.

International application No.

PCT/SG2002/000279

With regard to the elements of the international application:*	I.		Basis of the repor	rt	
the description, pages 1-16, as originally filed, pages , filed with the demand, pages , received on with the letter of  the claims, pages , as originally filed, pages , as amended (together with any statement) under Article 19, pages , filed with the demand, pages 17-22, received on 7 December 2004 with the letter of 7 December 2004  the drawings, pages 16-6-66, as originally filed, pages , filed with the demand, pages , received on with the letter of  the sequence listing part of the description:  pages , as originally filed pages , filed with the demand pages , received on with the letter of  With regard to the language, all the elements marked above were available or furnished to this Authority in the following language which is: the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).  the language of the translation furnished for the purposes of international preliminary examination (under Rule 85: and/or 55.3).  With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing: contained in the international application in written form.  flurnished subsequently to this Authority in written form.  furnished subsequently to this Authority in written form.  furnished subsequently to this Authority in written form.  The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  The amendments have resulted in the cancellation of:  the description, pages the claims, Nos. the drawings, sheets/fig.	1.	With			
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the drawings, sheets/fig.  This report has been established as if (some of) the amendments had not been made, since they have been consider			the descri	iption, pages	
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5. This report has been established as if (some of) the amendments had not been made, since they have been consider	•		the drawi	ngs, sheets/fig.	
go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**	5. ·		This report has be go beyond the disc	en established as if (some of) the amendments had not been made, since they have been considered to closure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**	
Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to i report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).	k	Repl repo	lacement sheets which ort as "originally file	th have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this	
** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report	**	Any	replacement sheet c	ontaining such amendments must be referred to under item 1 and annexed to this report	



International application No.

PCT/SG2002/000279

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1.	Statement		*
	Novelty (N)	Claims 1-30	YES
		Claims	NO
<b>;</b>	Inventive step (IS)	Claims 1-30	YES
		Claims	NO
	Industrial applicability (IA)	Claims 1-30	YES
		Claims	NO

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

US 6225546.

## Novelty (N) Claims 1-30

None of the cited documents disclose all of the features of each of the independent claims. Therefore all of the claims are novel.

## Inventive Step (IS) 1-30

The claimed invention is not obvious in the light of any of the cited documents nor is it disclosed in any obvious combination of them. It is also considered that it would not be obvious to a person skilled in the art in the light of common general knowledge either by itself or in combination with any of these documents.